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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

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TITLE OF THE INVENTION (280 characters max)

SYSTEM AND METHOD TO ENABLE WUSB APPLICATIONS IN A DISTRIBUTED UWB MAC

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METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT *(check one)*

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check or money order is enclosed to cover the filing fees — FILING FEE AMOUNT ($)

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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____.

Respectfully submitted,

SIGNATURE _____ Date July 13, 2004

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USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Box 1450, Alexandria, VA 22313-1450

SYSTEM AND METHOD TO ENABLE WUSB APPLICATIONS IN A DISTRIBUTED UWB MAC

The present invention relates to a system and method for enabling wireless universal serial bus applications in a distributed ultra wide-band MAC.

Universal serial bus (USB) technology is a popular and effective high-speed wired connection type for PCs that is migrating into the areas of consumer electronics (CE) and mobile devices. The next generation of USB technology is wireless USB (WUSB) and will provide the functionality of wired USB without the inconvenience of wires and will be based on ultra wideband UWB radio.

Referring now to FIG. 1, the typical or fundamental topology of WUSB is a hub-and spoke-architecture comprising a host 101 and at least one connected device 102. In this architecture, all traffic 103 is initiated by the host 101 to its at least one connected device 102, by allotting time slots and data bandwidth to each connected device 102.

The relationship between a host 101 and its at least one connected device 102 is termed a cluster. The connections are point-to-point between a WUSB host 101 and its at least one connected WUSB device 102.

A WUSB host 101 can logically connect to a maximum of 127 WUSB devices 102, considered an informal WUSB cluster. WUSB clusters coexist within an overlapping spatial environment with minimum interference, thus allowing a number of other WUSB clusters to be present within the same radio cell.

The WUSB architecture supports dual roles for a device 102 wherein a device 102 can also provide limited host capabilities. In this dual role model, such a device/host can avail itself of the services of a central host 101 (i.e., printers) and can create a second cluster providing services itself as a host for accessing data outside any existing cluster it is connected to. This architecture supports high spatial capacity in small areas so that multiple devices have concurrent access to high bandwidth.

In a wireless USB (WUSB) scenario there is one host 101 and one or more devices 102 that transmit data to the host. In the wired USB scenario the host sends a token or a poll frame to the devices to request data from the devices. It is expected that WUSB will use UWB MBOA MAC as a means to communicate between a host 101 and connected devices 102 over the wireless medium, see MBOA Wireless Medium Access Control (MAC) Specification For High Rate Wireless Personal Area Networks (WPANs), Technical

Specification, Draft 0.5, April 2004, which is hereby incorporated by reference as if fully set forth herein. Since the UWB MBOA MAC is distributed, there needs to be a method by which a host can reserve channel resources on behalf of connect devices 102 so that connected devices 102 can transmit data when requested by the host 101.

In the MBOA MAC specification the medium can be reserved by means of the "Distributed Reservation Protocol" (DRP). This protocol comprises two mechanisms of negotiating a reservation of channel time: an explicit negotiation by means of dedicated command frames, and an implicit negotiation by inclusion of the DRP Information Elements (IEs) in the beacon of sender and receiver's. In both cases, once the reservation is established, the reservation information is included in the beacon of sender as well as receiver(s) in every superframe, in which the reservation is still active. This is necessary in order to inform neighboring devices of sender and receiver(s) about the existing reservation. These neighboring devices have to store the reservation information received and abstain from medium access during the reserved period of time.

DRP reservations can be unicast or multicast reservations between two, respectively a group of devices.

Thus, there is a need for a system and method for UWB MAC to reserve wireless channel resources so that connected devices 102 can send data to a host 101.

The present invention is based on a distributed UWB MBOA MAC that uses distributed reservation protocol (DRP) to exchange both isochronous and asynchronous data. That is, the present invention relates to data transfer between connected devices 102 and a host 101 that use the DRP protocol. The present invention provides a system and method for incorporating DRP-based host-device communication in wireless USB (WUSB).

In a first embodiment, the host 101 uses a multicast DRP (distributed reservation protocol) frame on behalf of connected devices 102 to reserve wireless channel resources for data transfer between the host 101 and connected devices 102 based on connected device characteristics and what traffic they have.

In the second embodiment the host 101 sends a unicast DRP frame to a connected device 102 and negotiates the use of channel resources for data transfer between the connected device 102 and the host 101.

In a third embodiment the host 101 sends a Poll frame to a connected device 102 to trigger the transmission from said device 102.

Thus, the present invention is a system and method for a distributed MAC protocol that provides a solution to incorporate WUSB data transfer therein.

Other features and advantages of the present invention will be obvious from the following drawings and detailed description of the invention.

FIG. 1 illustrates a typical hub-and-spoke WUSB architecture;

FIG. 2 illustrates a micro-scheduled DRP reservation according to the WUSB Working Group standard.

FIG. 3a illustrates an architecture of a host according to the present invention;

FIG. 3b illustrates an architecture of a connected device according to the present invention;

FIG. 4 illustrates a finite state diagram (FSD) for host data transfer processing.

It is to be understood by persons of ordinary skill in the art that the following descriptions are provided for purposes of illustration and not for limitation. An artisan understands that there are many variations that lie within the spirit of the invention and the scope of the appended claims. Unnecessary detail of known functions and operations may be omitted from the current description so as not to obscure the present invention.

The present invention provides a system and method for incorporating the host-device communication in wireless USB (WUSB). Referring now to FIG. 1, in a WUSB scenario there is one host 101 and one or more connected devices 102 that transmit data to the host 101. In the wired USB scenario the host sends a token or a poll frame to the devices to request data from the devices. WUSB could use UWB MBOA MAC as a means to communicate to other devices over the wireless medium. The UWB MBOA MAC is distributed and the present invention provides a system and a method by which a host 101 can reserve channel resources on behalf of connected devices 102 so that connected devices 102 can transmit data when requested by the host. That is, the present invention is a system and method for reserving wireless channel resources so that connected devices 102 can send data to a host 101.

In a first embodiment, a host 101 of a WUSB initiates a multicast DRP frame to reserve wireless channel resources with/on behalf of at least one WUSB device 102 connected thereto. Each of the at least one device 102 that is connected to the host 101 communicates device 102 characteristics to the host 101 that are used by the host 101 to reserve wireless channel capacity on behalf of the at least one device 102. One advantage of this embodiment is that the overhead of reservation is very low, since the multicast reservation is done for multiple devices. In addition, a combined reservation by the host results in there being only

one contiguous time period for the host 101 to receive data from the at least one device 102. In this first embodiment, the contiguous time period is scheduled for the at least one device using a protocol called micro-scheduling. The micro-scheduling protocol is defined in the "WUSB Key Developers, USB-IF, *WUSB Micro-scheduling Specification, Revision 0.5c*, December 2003", which is hereby incorporated by reference in its entirety and is illustrated in FIG 2. Micro-scheduling adds an efficient and extensible medium allocation mechanism for applications that require lower latency and finer grained bandwidth control. Under Micro-scheduling, the host reallocates the channel time within a DRP reservation on an intra-superframe basis. This allows the devices to rapidly and efficiently change the amount of channel time allocated to other devices that are aware of and permitted to use the DRP reservation. The group using micro-scheduling is called a micro-scheduled cluster. The devices within the cluster that allocates the use of the medium within the micro-scheduled DRP reservation is called the Micro-Scheduled Cluster Controller (MSCC).

Thus, the multicast DRP protocol of the present invention is a way to incorporate into UWB MAC the existing micro-scheduling scheme of the WUSB specification. The disadvantage of this scheme is that the host 101 must perform another multicast reservation or perform a unicast reservation for those devices 102 that did not agree with the initial multicast reservation.

In a second embodiment, the host 101 initiates a separate unicast DRP reservation to the at least one device 102 to reserve channel resources. In this second embodiment, the number of reservation frames that need to be sent on the channel is directly proportional to the number of devices 102 connected to the host 101. This reservation initiation is equivalent to the micro-scheduled management command (MMC) of the current WUSB specification. Once the reservation is made, the host 101 uses a poll frame to request the at least one device 102 to transmit data during the reserved period. Advantages of the second embodiment include (1) it is a natural extension of DRP and (2) WUSB devices can be very simple. However, higher DRP negotiation overhead is incurred (depending on the number of WUSB devices). And, because DRP reservations may be spread through a superframe, this second embodiment may be less efficient than the micro-scheduling used by the first embodiment.

In a third embodiment, for WUSB transmissions that do not require DRP, the poll frame may also be sent by the host 101 using the EDCA channel access, that has control of the medium for a time specified by the EDCA TXOP limit, to request that the at least one device transmit data. The third embodiment has the advantage of flexibility and does not

require devices to support and implement DRP mechanisms. However, EDCA is a contention-based access and there are no guarantees against delays.

For each embodiment, the host 101 must know the capabilities of the at least one device 102. These capabilities are included by the at least one device 102 when the at least one device 102 transmits a Beacon. The host 101 also includes the host 101 capabilities in a Beacon. In each embodiment, the devices 102 announce if traffic is pending to the WUSB host 101. In each embodiment, WUSB device notification traffic can use a DRP reservation or device notification traffic can be sent using EDCA or using some signaling in the beacon frames.

WUSB host discovery is done via a Beacon in which the host includes its capabilities.

In order to achieve better packing and facilitate implementation, the Offset and Duration fields of a DRP reservation are preferably set to a multiple of "X", where X is selected based on the combination of the desired resolution of the DRP reservation and the size of the DRP slot. Typically, X = 625usec.

Referring now to FIG. 1, a typical WUSB network employs a hub-and-spoke architecture having a host 101 as the hub and at least one connected device 102 as a spoke. A typical WUSB host 101, according to the present invention, may include a host MAC module 300 with an architecture that is illustrated in the block diagram of FIG. 3a. A host 101 may include a host MAC module 300 having a controller 301 operatively coupled to at least a transmitter 302, a host data transfer processing component 303 comprising a host DRP processing module 303a and a host device notification processing module 303b according to the present invention, and a receiver 304. The transmitter 302 and the receiver 304 are operatively coupled to an antenna 305. The host DRP processing component 303a provides adaptive programming such that, for example, at least one of multicast and unicast DRP processing is accomplished by the host 101 for each connected device 102.

A typical WUSB connected device 102 may optionally include a more limited version of the host MAC module 300 as device MAC module 350 with an architecture that is illustrated in the block diagram of FIG. 3b. Each connected device 102 may include a device MAC module 350 having a controller 352 operatively coupled to at least a transmitter 302, a device processing component 353 comprising a device DRP processing module 353a and a device notification processing module 353b according to the present invention, and a receiver 304. The transmitter 302 and the receiver 304 are operatively coupled to an antenna 305. The device DRP processing component 353a provides adaptive programming such that, for example, at least one of multicast and unicast DRP processing is accomplished by the device

102 in response to reservations made by the host 101 and such that the connected device 102 further accepts or rejects a reservation made on its behalf by the host 101. In addition, if a connected device has additional capabilities for acting as a host itself, there is an optional device/host subcomponent (not shown), of each the modules 353a-b.

Referring now to FIG. 4, a finite state diagram (FSD) illustrates host data transfer processing 303 including DRP reservation functionality of the host DRP processing component 303a. Once the WUSB host is initialized 401, it starts beaconing 402 following the rules specified in the MBOA MAC. The beacon includes the WUSB host capabilities, so that WUSB devices can find the WUSB host by means of regular MAC beacon reception. Once WUSB devices are initialized the devices follow the beaconing rules of the MBOA MAC, and look for the beacon from WUSB host(s).

The WUSB waits to receive the device notification traffic (DNT) via EDCA if DRP is not supported 403, or via EDCA or DRP if DRP is supported 405. Following the EDCA operation 403, once DNT traffic is received via EDCA, the WUSB host uses EDCA mechanisms to access the medium and to poll the WUSB devices 406 according to a third embodiment of this invention. It should be noted that DNT traffic might be received via EDCA 403 even though the WUSB host supports DRP.

If DNT traffic is received and DRP is supported WUSB host initiates the DRP data negotiation process 405.

- If the WUSB host and devices support multicast DRP, the WUSB host includes a DRP multicast reservation in the beacon 408. Devices may adopt the reservation and include it in their own beacons. If all devices adopt the multicast reservation the WUSB host starts the micro-scheduling operation. If some devices do not adopt the multicast reservation, because, for example, they have a conflict with a neighbor's reservation, the WUSB host may initiate a second WUSB multicast reservation or a unicast reservation with said devices 411. In a first embodiment of the invention the WUSB devices support at least the implicit DRP reservation mechanism. This requires the devices to listen to the beacons of other devices and to store the occupancy of all data slots during the superframe. This allows the devices to eventually reject the multicast reservation request of the WUSB host and to eventually propose an alternative reservation time. In a second embodiment of the invention, the WUSB devices do not need to support the full DRP-functionality and just copy the DRP reservation information element from the beacon of the WUSB host into their own beacon.

- If WUSB host or devices do not support micro-scheduling during multicast DRP reservations, the WUSB host initiates a unicast DRP negotiation 407 and starts WUSB operation by using Poll Frames during the DRP reservations 409 according to another embodiment.

It should be appreciated that, to satisfy the requirements of devices with different capabilities, a combination of all mechanisms may be performed in parallel by the WUSB. Also it is possible that the WUSB host uses EDCA access to deliver traffic or to poll connected devices 406, even though a DRP reservation was established 409 410. This is useful for scenarios were there are interferences and channel errors and the time during the DRP reservation cannot be used.

While the preferred embodiments of the present invention have been illustrated and described, it will be understood by those skilled in the art that the superframe as described herein is illustrative and various changes and modifications may be made and equivalents may be substituted for elements thereof without departing from the true scope of the present invention. In addition, many modifications may be made to adapt the teachings of the present invention to a particular situation without departing from its central scope. Therefore, it is intended that the present invention not be limited to the particular embodiments disclosed as the best mode contemplated for carrying out the present invention, but that the present invention include all embodiments falling with the scope of the appended claims.

We claim:

1. A method for host-device communication (103) in a first WUSB network (100) including a host (101) and at least one connected device (103), comprising the steps of:

beaconing (402) according to a distributed UWB MAC protocol by the host and the at least one connected device;

receiving by the host DNT traffic (403) (405); and

operating the WUSB network by the host according to the capabilities of the connected devices (406) (409) (410).

2. The method of claim 1, further comprising the step of, if distributed reservation is supported, setting an offset field and a duration field in a DRP reservation to a multiple of a predetermined value.

3. The method of claim 2, wherein the predetermined value is 625usec.

4. The method of claim 1, further comprising the at least one connected device (102) performing one of the steps of:

i. using DRP access to indicate traffic;

ii. using EDCA to send notification traffic; and

iii. signaling in the beacons to send notification traffic.

5. The method of claim 1, wherein said beaconing step further comprises the steps of:

including in a host beacon capabilities of the host (402); and

including in a connected device beacon capabilities of the at least one connected device.

6. The method of claim 1, further comprising the step of the at least one connected device (102) discovering the host (101) via the host beacon.

7. The method of claim 1, wherein the operating step further comprises the step of if the connected device supports EDCA, the host performing the steps of:

using an EDCA mechanism to access the medium (406);

polling the at least one connected device (102) to request that the at least one connected device (102) transmit data; and

receiving data from the at least one connected device (102) as a result of the poll.

8. The method of claim 7, further comprising the at least one connected device (102) performing one of the steps of:

using DRP access to indicate traffic;

using EDCA to send notification traffic; and

signaling in the beacons to send notification traffic.

9. The method of claim 1, wherein the operating step further comprises the step of if the connected device (102) supports Unicast DRP, performing a Unicast reservation by the host performing the steps of:

initiating a Unicast DRP reservation to the at least one device to reserve channel resources for transmission of data to the host by the at least one device (407);

polling the at least one connected device during DRP to request that the at least one connected device transmit data (409); and

receiving data from the at least one connected device at a result of the poll.

10. The method of claim 9, further comprising the at least one connected device (102) performing one of the steps of:

using DRP access to indicate traffic;

using EDCA to send notification traffic; and

signaling in the beacons to send notification traffic.

11. The method of claim 1, wherein the operating step further comprises the step of if the connected device (102) supports Multicast DRP, performing a Multicast reservation by the host (101) performing the steps of:

reserving channel resources in a first DRP reservation by inclusion of multicast DRP in beacons to achieve a first reservation (408);

for each connected device that is a non-accepting device that does not accept the Multicast DRP reservation, initiating regular DRP negotiation with each non-accepting device to achieve at least one of a Unicast reservation for each non-accepting and a second DRP reservation (411);

micro-scheduling the channel resources of the first and second DRP reservation among those connected devices of the at least one connected device that accept the multicast DRP reservation (410); and

receiving data from the at least one connected device.

12. The method of claim 11, further comprising the at least one connected device (102) performing one of the steps of:

using DRP access to indicate traffic;

using EDCA to send notification traffic; and

signaling in the beacons to send notification traffic.

13. The method of claim 12, wherein the initiating regular DRP negotiation step further (411) comprises the step of performing at least one of the steps of initiating a Unicast DRP reservation with a non-accepting device and initiating a second Multicast DRP reservation with non-accepting devices.

14. The method of claim 13, further comprising the step of the at least one connected device (102) acting as a host (101) in second WUSB network.

15. The method of claim 14, wherein the at least one connected device (102) acting as a host (101) of the second WUSB network performs at least some of the steps performed by the host (101) of the first WUSB network.

16. The method of claim 15, further comprising the step of if distributed reservation is supported setting an offset field and a duration field in a DRP reservation to a multiple of a predetermined value.

17. The method of claim 16, wherein the predetermined value is 625usec.

18. The method of claim 13, further comprising the step of if distributed reservation is supported setting an offset field and a duration field in a DRP reservation to a multiple of a predetermined value.

19. The method of claim 18, wherein the predetermined value is 625usec.

20. A host apparatus (300) for host-device communication in a first WUSB network including the host (101) and at least one connected device (102), comprising:

a transmitter (301) for sending beacons, traffic notifications, medium reservations and data;

a receiver (304) for receiving beacons, traffic notifications, medium reservations and data;

a host data transfer processing component (303a) that processes data transferred between the host (101) and the at least one connected device (102); and

a controller (302) operably coupled to the transmitter (301), receiver (304) and host data transfer processing component (303) and configured to direct the transmitter (301), receiver (304) and host data transfer processing component (303) to -

- start beaconing according to a distributed UWB MAC protocol and announce host capabilities (402),
- receive and process according to a distributed UWB MAC protocol, beacons of the at least one connected device (102) including capabilities of the at least one device,
- receive and process DNT traffic (405), and
- start and control WUSB operation of the network (406) (409) (410).

21. The host apparatus of claim 20, wherein the controller (302) is further configured to direct the transmitter (301), receiver (304) and host data transfer processing component (303) to:

include multicast DRP in beacons and then start micro-scheduling operation if multicast DRP is supported (410);

receive and process DNT traffic (405) and if only unicast DRP is supported by the connected device negotiate unicast DRP (407) with the at least one connected device (102) and then start WUSB operation (409); and

receive and process DNT traffic (403) and if only EDCA is supported by the connected device start WUSB operation with poll frame using EDCA (406).

22. The host apparatus of claim 20, wherein the controller (302) is further configured to direct the device data transfer processing component (353) to set an offset field and a duration field in each DRP reservation to a multiple of a predetermined value if distributed reservation is supported.

23. The host apparatus of claim 22, wherein the predetermined value is 625usec.

24. The host apparatus of claim 20, wherein when the connected device (102) only supports EDCA, the controller (302) is further configured to control the operation of the host by directing the receiver (304), transmitter (302) and host data transfer processing unit (303) to:

- use an EDCA mechanism to access the medium (406);
- poll the at least one connected device (102) to request that the at least one connected device transmit data (406); and
- receive data from the at least one connected device as a result of the poll.

25. The host apparatus of claim 20, wherein the connected device (102) supports Unicast DRP the controller (302) is further configured to control the operation of the host (101) by directing the receiver (304), transmitter (302) and host data transfer processing unit (303) to:

- initiate a Unicast DRP reservation (407) to the at least one device to reserve channel resources for transmission of data to the host (101) by the at least one connected device (102);
- poll the at least one connected device (120) during DRP to request that the at least one connected device (102) transmit data (409); and
- receive data from the at least one connected device (102) at a result of the poll.

26. The host apparatus of claim 20, wherein the at least one connected device (102) supports multicast DRP and the controller (302) is further configured to control the operation of the host (101) by directing the receiver (304), transmitter (302) and host data transfer processing unit (303) to:

- reserve channel resources in a first Multicast DRP reservation by inclusion of multicast DRP in beacons to achieve a first reservation (408);
- for each said at least one connected device (102) that is a non-accepting device that does not accept the first Multicast DRP reservation, initiate regular DRP negotiation with each non-accepting device to achieve at least one of a Unicast reservation for each non-accepting and a second DRP reservation (411);
- micro-schedule the channel resources of the first and second DRP reservation among those connected devices of the at least one connected device that accept the multicast DRP reservation (410); and
- receive data from the at least one connected device.

27. The host apparatus of claim 26, wherein regular DRP negotiation comprises at least one of negotiation of a Unicast DRP reservation with a non-accepting device and a second Multicast DRP reservation for non-accepting devices.

28. A method for host-device communication in a WUSB network including a host and at least one connected device, comprising the steps of:

beaconing according to a distributed UWB MAC protocol by the host and the at least one connected device;

the host establishing a multicast reservation between the host and the at least one connected device; and

running a WUSB protocol inside the multicast reservation.

29. The method of claim 28, wherein the establishing and running steps each further comprise the steps of

reserving channel resources by inclusion of a multicast reservation information element in beacons to achieve a first reservation;

micro-scheduling the channel resources of the multicast reservation among those connected devices of the at least one connected device that accepted the multicast reservation; and

receiving data from the at least one connected device.

30. The method of claim 29, wherein the reserving step further comprises the steps of:

initiating a unicast reservation with a non-accepting device; and

initiating a second multicast reservation with a plurality of non-accepting devices.

31. The method of claim 28, further comprising the step of setting an offset field and a duration field in a reservation to a multiple of a predetermined value.

32. The method of claim 30, wherein the predetermined value is 625usec.

33. The method of claim 28, further comprising the at least one connected device performing one of the steps of:

using DRP access to indicate traffic;

using EDCA to send notification traffic; and

signaling in the beacons to send notification traffic.

34. The method of claim 33, wherein said beaconing step further comprises the step of including in a host beacon capabilities of the host and in a connected device beacon capabilities of the at least one connected device.

35. The method of claim 33, further comprising the step of the at least one connected device discovering the host via a host beacon.

36. A method for host-device communication in a WUSB network including a host and at least one connected device, comprising the steps of:

beaconing according to a distributed UWB MAC protocol by the host and the at least one connected device;

establishing unicast reservations between the host and the at least one connected device; and

running a WUSB protocol inside the unicast reservations.

37. The method of claim 36, wherein the establishing and running steps each further comprise the steps of

the host initiating a unicast reservation to the at least one connected device to reserve channel resources for transmission of data to the host by the at least one connected device;

the host polling the at least one connected device during the reservation to request that the connected devices transmit data; and

the at least one connected device transmitting data to the host as a result of the poll.

38. The method of claim 36, further comprising the at least one connected device performing one of the steps of:

using DRP access to indicate traffic;

using EDCA to send notification traffic; and

signaling in the beacons to send notification traffic.

39. The method of claim 38, wherein said beaconing step further comprises the step of including in a host beacon capabilities of the host and in a connected device beacon capabilities of the at least one connected device.

40. The method of claim 38, further comprising the step of the at least one connected device discovering the host via a host beacon.

41. A method for host-device communication in a WUSB network including a host and at least one connected device, comprising the steps of:

the host using an EDCA mechanism to access the medium;

the host polling the at least one connected device to request that the at least one connected device transmit data; and

the host receiving data from the at least one connected device as a result of the poll.

42. The method of claim 41, wherein the host and the at least one connected device perform the step of beaconing in accordance with a distributed UWB MAC protocol.

43. The method of claim 41, further comprising the step of the at least one connected device performing one of the steps of:

using DRP access to indicate traffic;

using EDCA to send notification traffic; and

signaling in the beacons to send notification traffic.

44. The method of claim 43, wherein said beaconing step further comprises the step of including in a host beacon capabilities of the host and in a connected device beacon capabilities of the at least one connected device.

45. The method of claim 43, further comprising the step of the at least one connected device discovering the host via a host beacon.

ABSTRACT

A system and method is provided for incorporating host-device communication in wireless USB (WUSB). A host (101) either uses a multicast DRP frame on behalf of connected devices (102) to reserve wireless channel resources, a unicast DRP frame or EDCA with a Poll Frame. In the case of a unicast DRP frame the number of unicast frames sent for reservation depends on the number of connected devices (102).

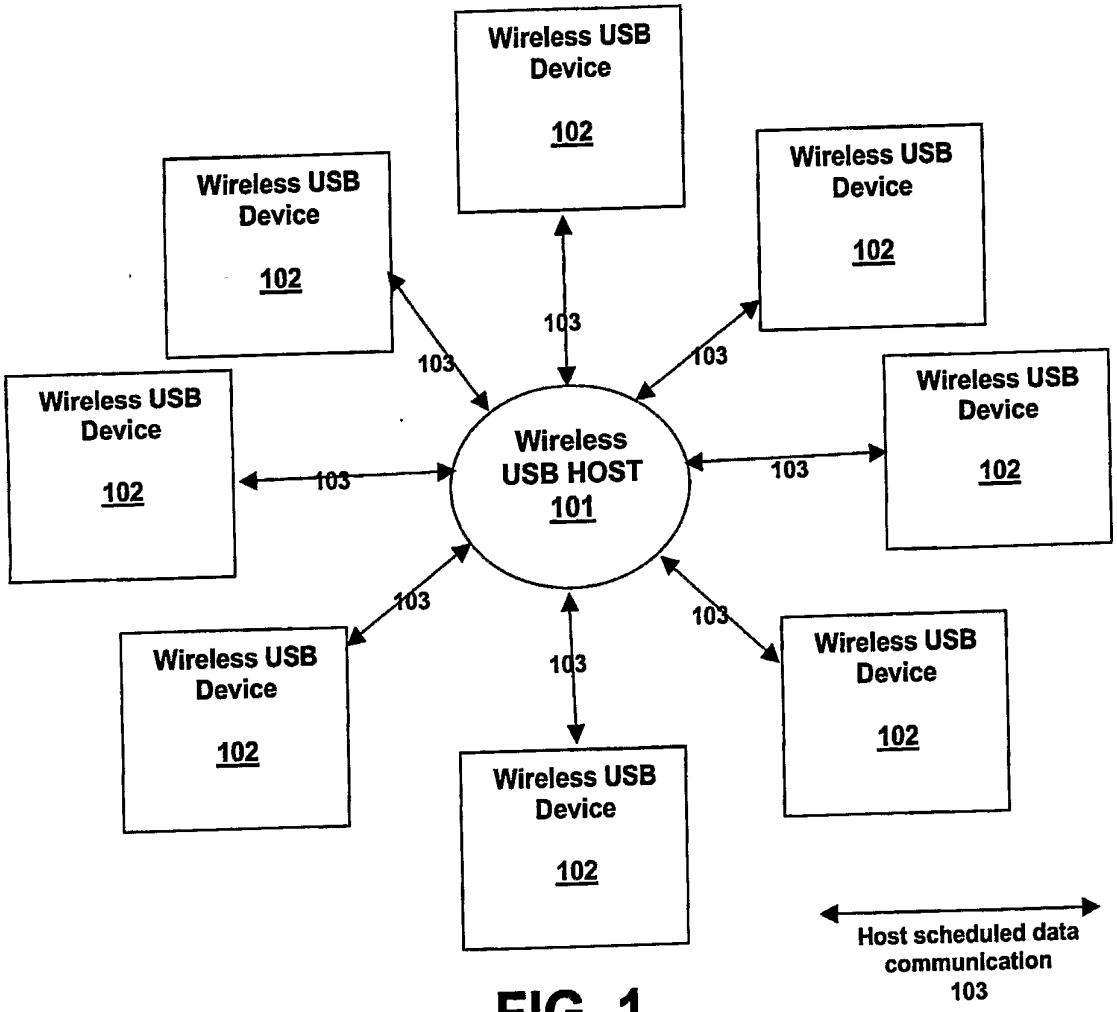

FIG. 1

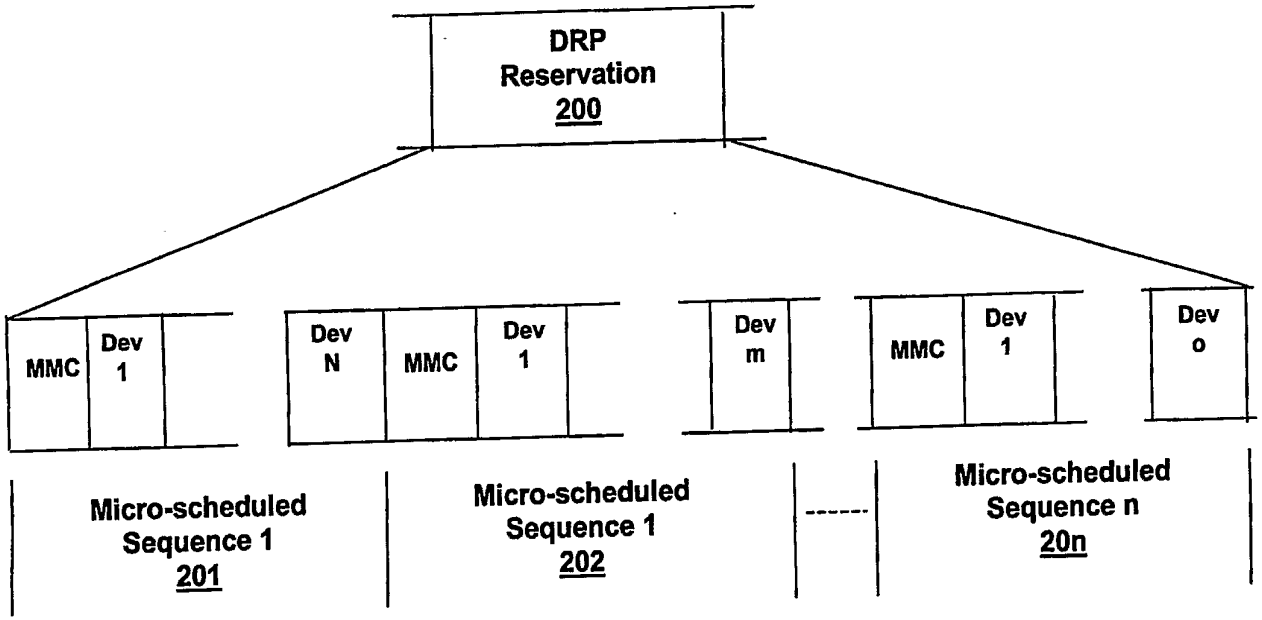

FIG. 2

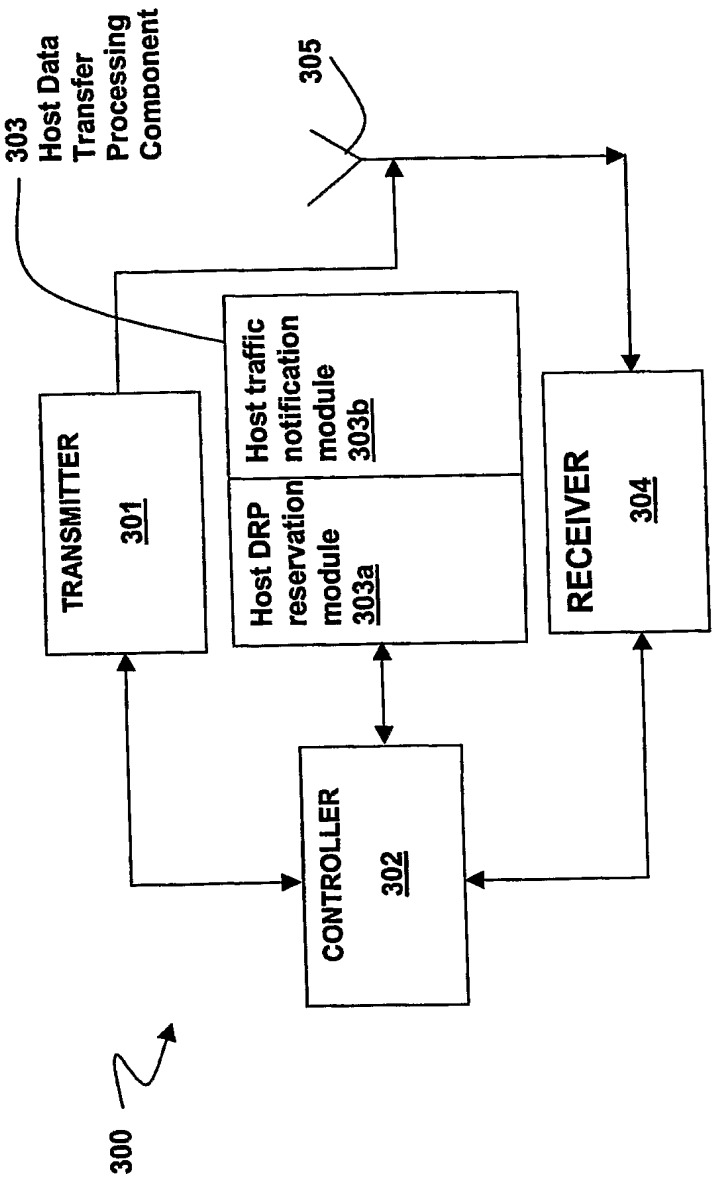

FIG. 3a

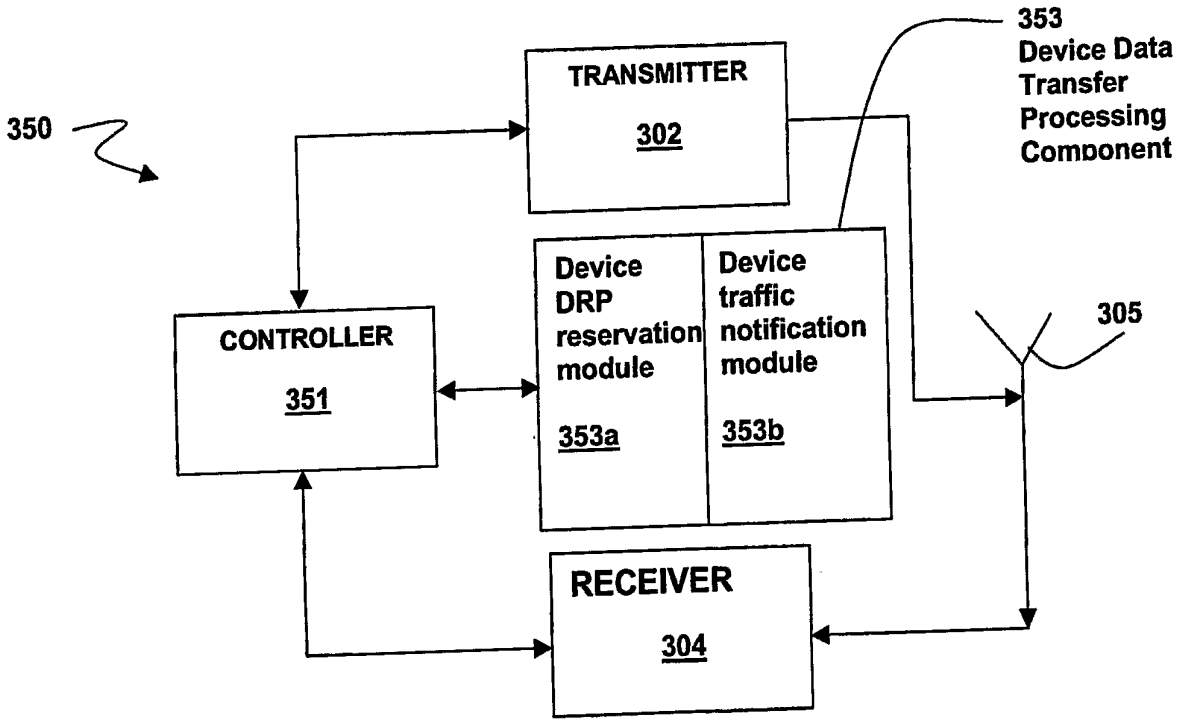

FIG. 3b

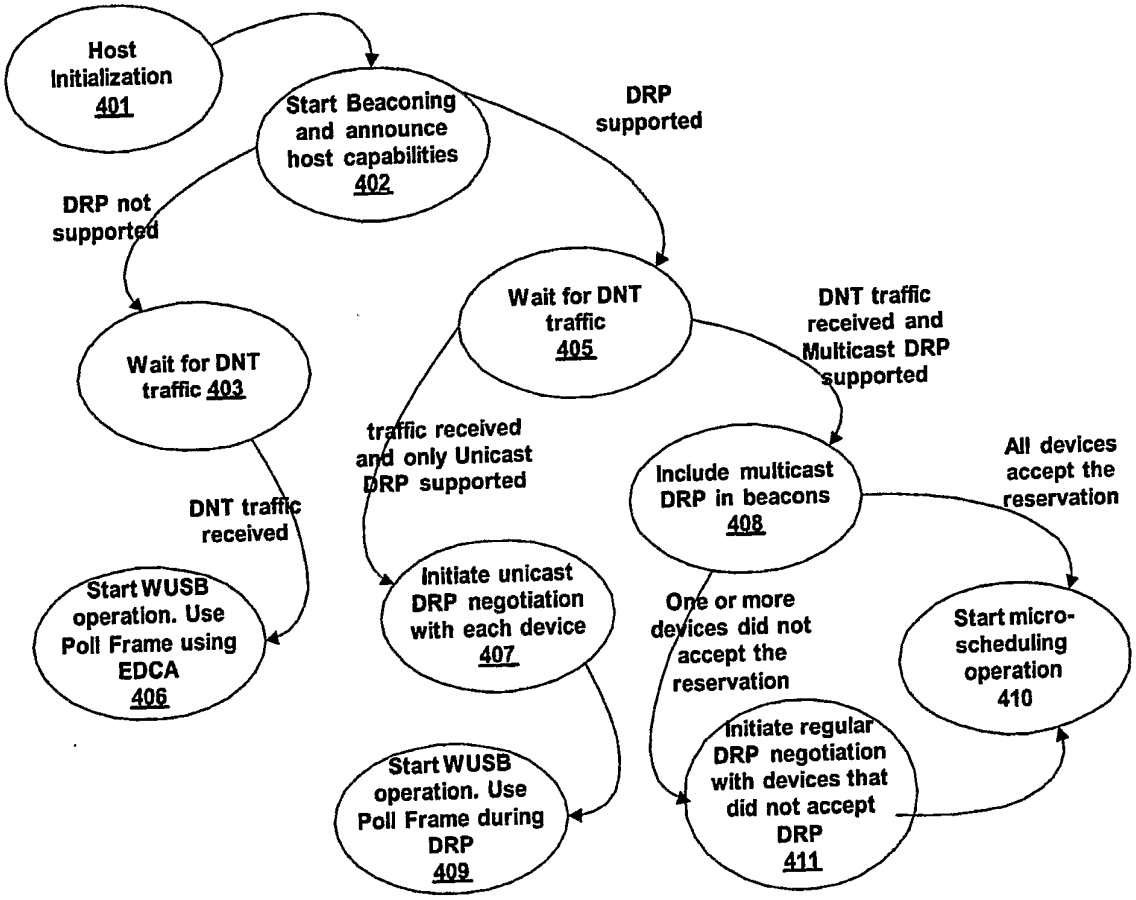

FIG. 4